NextGen & Operations Planning

Concept Development & Validation Group

Role In NextGen Transition

August 2008

EAB Action Item #108

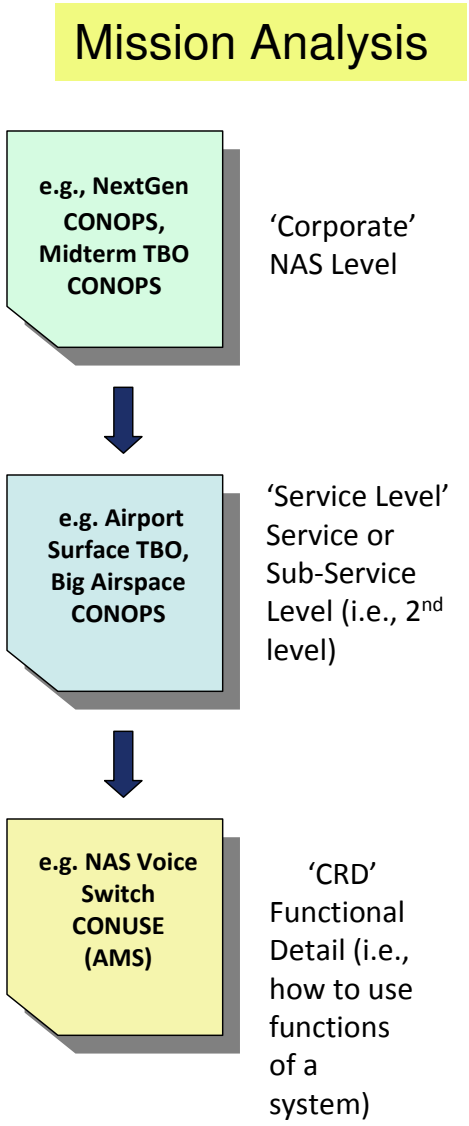
- *Bring to EAB the actions required within the ATO of how to meet mid-term to far-term NextGen capabilities where 'in-kind' replacement of NAS systems does not apply because it reflects such a change in the way Air Traffic is achieved and will possibly impact the Safety of US Air Traffic. This could form the basis of a 'Theory of Operations' which would include a Mid-Term Operations Concept and allocate requirements down to the program/project level.*

Outline

- Concept Documents
- Roles & Responsibilities
- CD&V Group Products
- 2nd Level Concept Development
- FY08/FY09 2nd Level Ops Concepts
- NAS Level Concept Development
- Concept Development / Validation Process
- Operational Concept Transfer
- Work in Progress
- Common Questions

Concept Documents

- Concept of Operations (IEEE Standard 1362-1998)
  - An operationally oriented description of user's needs, including qualitative and quantitative characteristics, that communicates how the system is expected to operate in its environment.
- Service or Sub-Service Level Concept of Operations (NAS SEM)
  - More insight, detail, in-depth information
  - Elaborates on capabilities and use
- Concept of Use (NAS SEM)
  - Extension of the ConOps, more detail, more elaboration
  - Narrative describing functional characteristics



C&DV Group Roles and Responsibilities

- Develop and validate (i.e., evaluate) NAS Level and 2nd Level Concepts of Operations
- Support development of Concept of "Use" documents for future technologies
  - Development responsibility of Service Unit going through CRD
- Develop functional and operational requirements associated with implementing new concepts
- Foster transition of concepts and requirements to appropriate service units
- Coordinate Concepts and Validation Processes with EUROCONTROL (Action Plans) and other research organizations

C&DV Group Products

- Midterm NAS-level TBO CONOPS with Operational Scenarios
- 2025 NAS-level TBO CONOPS with Operational Scenarios
- 2nd Level CONOPS
- Requirements – Functional and Operational
- ROM Cost-Benefits
- Preliminary Safety Assessments (pre-CRD)

Bottoms Up Approach – Developing 2nd level CONOPS
Mid Term vs End State

2017

Trajectory Based Operations
- Delegated Responsibility of Separation
- Ocean in Trail Climb & Decent
- Automation Support for Mixed Environment
- Initial Conflict Resolution Advisories
- Flexible Entry Times for Oceanic Tracks
- Point-in Space Metering
- Flexible Airspace Management
- Increased capacity & Efficiency using RNAV and RNP

Increased Arrival & Departure at High Density Airports
- Improved Operations to closely spaced parallel Runways
- Initial Surface Traffic Management
- Time Based Metering using RNP and RNAV route assignments
- Integrated Arrival/Departure Airspace Management

Increased Flexibility in Terminal Environment
- Wind based wake procedures
- GBAS precision approaches
- Use optimized profile decent
- Provide full surface situation information
- Enhanced surface traffic operations

Improved Collaboration ATM
- Continuous flight day evaluation
- Traffic management initiatives with flight specific trajectories
- Improved management of Airspace for special use
- Trajectory flight data management
- Provide full flight plan constant evaluation with feedback
- On demand NAS information

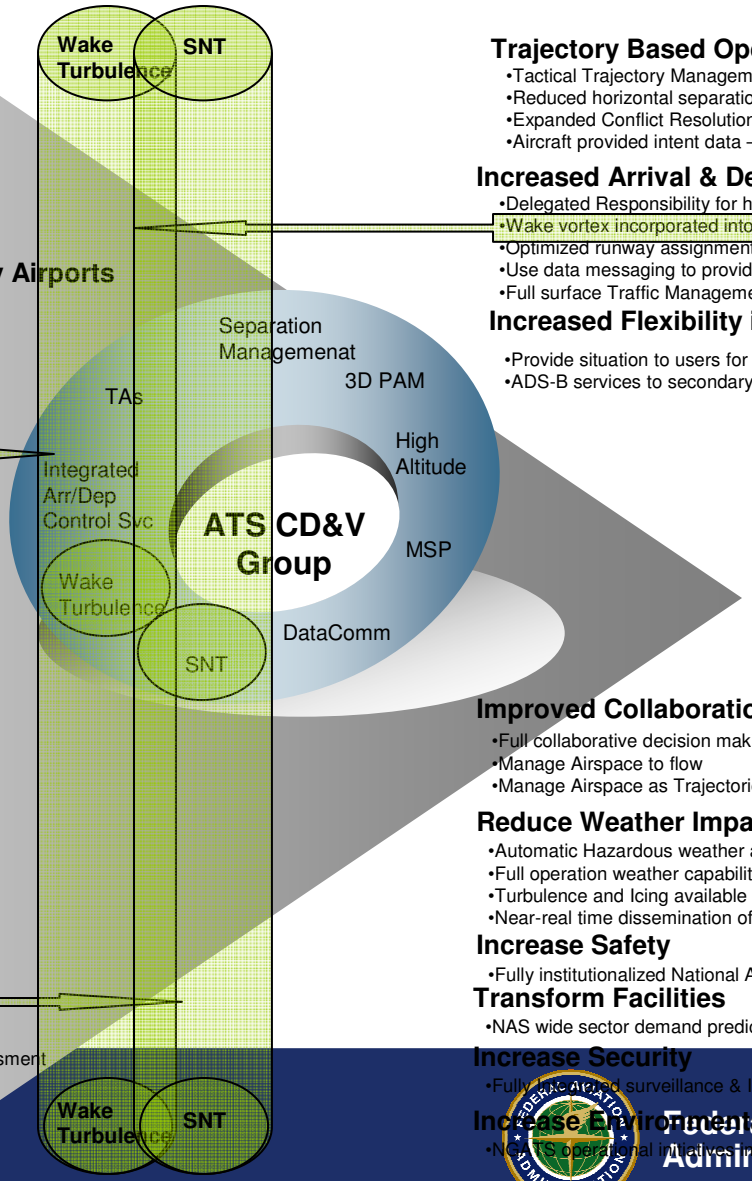
Reduce Weather Impact
- Trajectory based weather impact evaluation

Increase Safety
- Safety management system
- Aviation safety interaction analysis sharing
- Safety management enterprise services

Transform Facilities
- Integration, development & operations analysis capability
- NextGen Facilities
- Net-Centric virtual facilities

Increase Security
- Threat detection and tracking, Impact analysis & risk based assessment
- Integrated Incident Detection & Resources
- ISS & Surveillance Integration

Increase Environmental Performance
- National EMS supports Integrated Environmental performance



2025

Trajectory Based Operations
- Tactical Trajectory Management
- Reduced horizontal separation standards
- Expanded Conflict Resolution
- Aircraft provided intent data – conflict resolution

Increased Arrival & Departure at High Density Airports
- Delegated Responsibility for horizontal separation
- Wake vortex incorporated into flow
- Optimized runway assignments
- Use data messaging to provide flow & taxi assignments
- Full surface Traffic Management with conformance monitoring

Increased Flexibility in Terminal Environment
- Provide situation to users for all weather operations
- ADS-B services to secondary Airports

Improved Collaboration ATM
- Full collaborative decision making
- Manage Airspace to flow
- Manage Airspace as Trajectories

Reduce Weather Impact
- Automatic Hazardous weather alert notification
- Full operation weather capability
- Turbulence and Icing available on MDCRS
- Near-real time dissemination of weather info

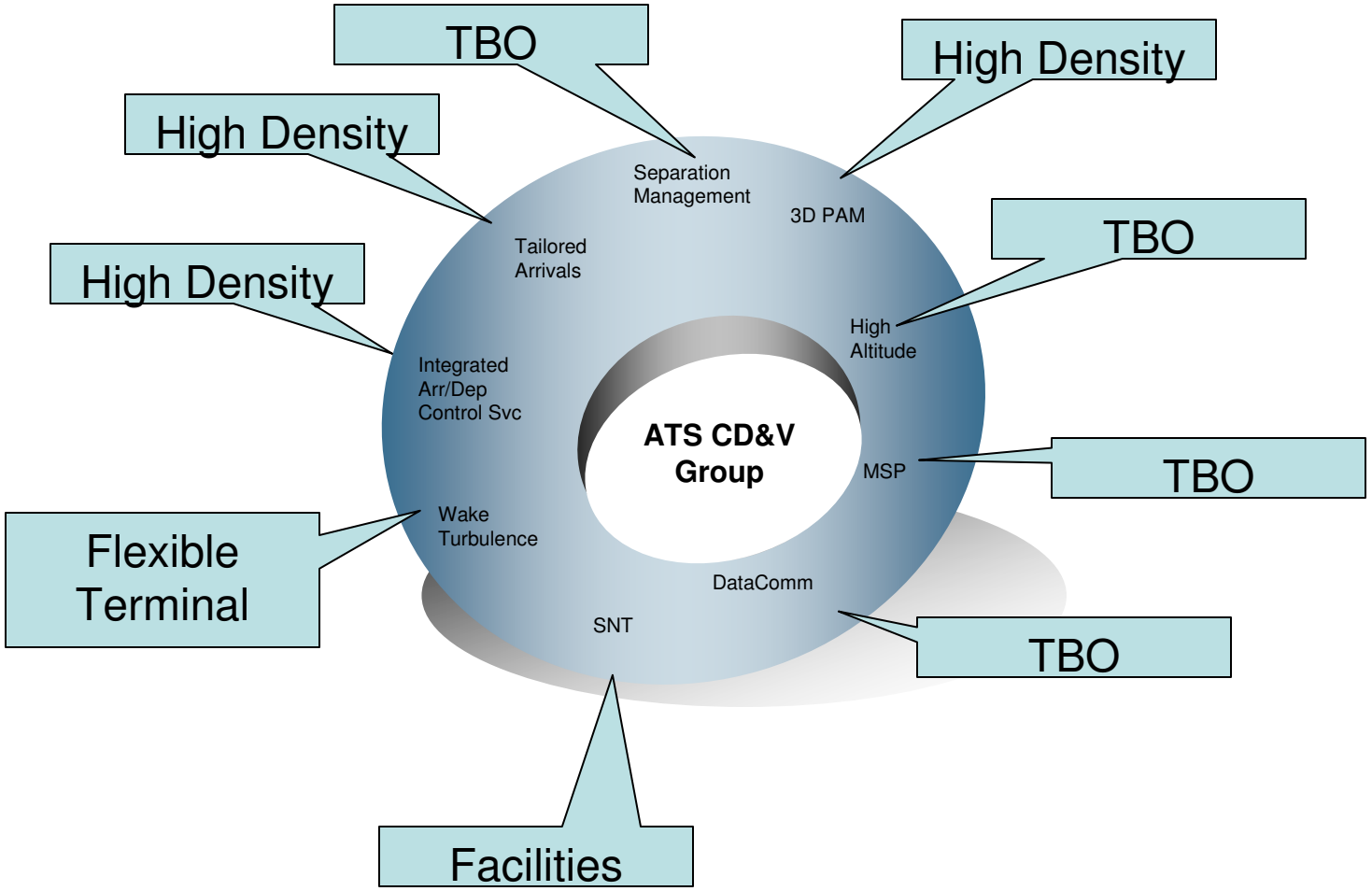
Increase Safety
- Fully institutionalized National Aviation Safety policy & continuous safety improvement

Transform Facilities
- NAS wide sector demand prediction & resource planning

Increase Security
- Fully [illegible] surveillance & ISSA operations security

Increase Environmental Performance
- NextGen operational initiatives implemented that reduce environmental impacts

FY08/FY09 2nd Level CONOPS in Progress (by ATS CD&V Group)



Developing Midterm TBO End-End CONOPS

2017

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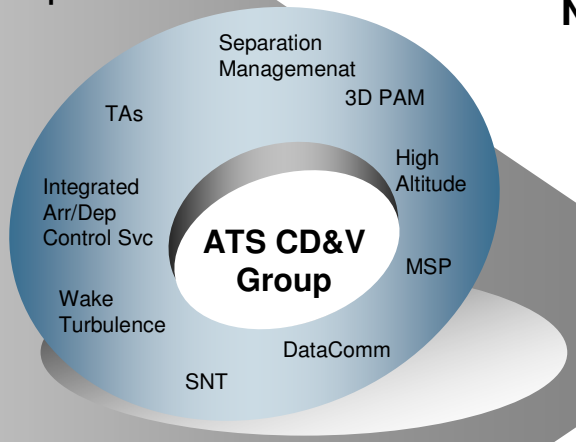


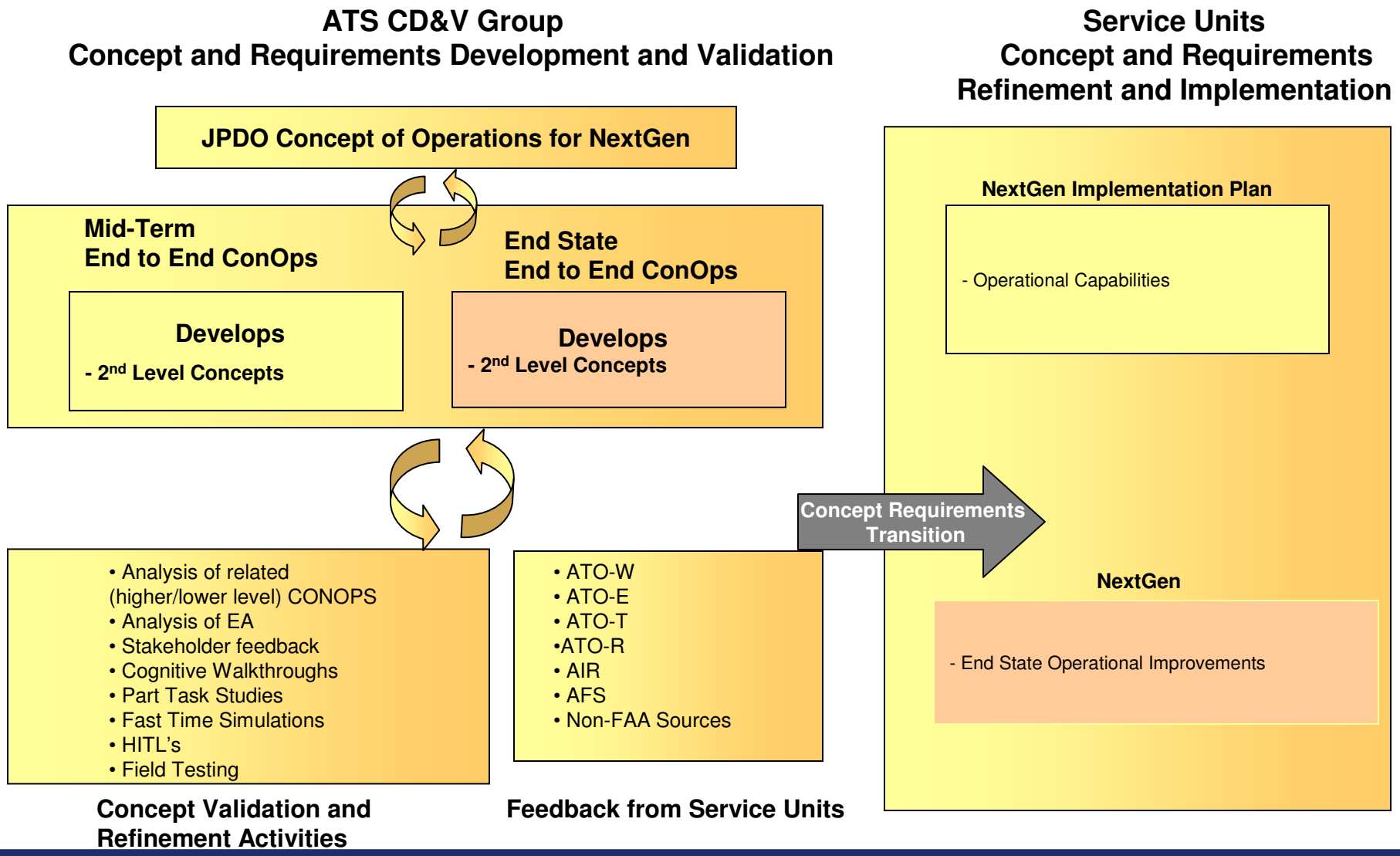
NAS Midterm Concept of Operations

- **Narrative**
- **Detailed Operational Scenarios**

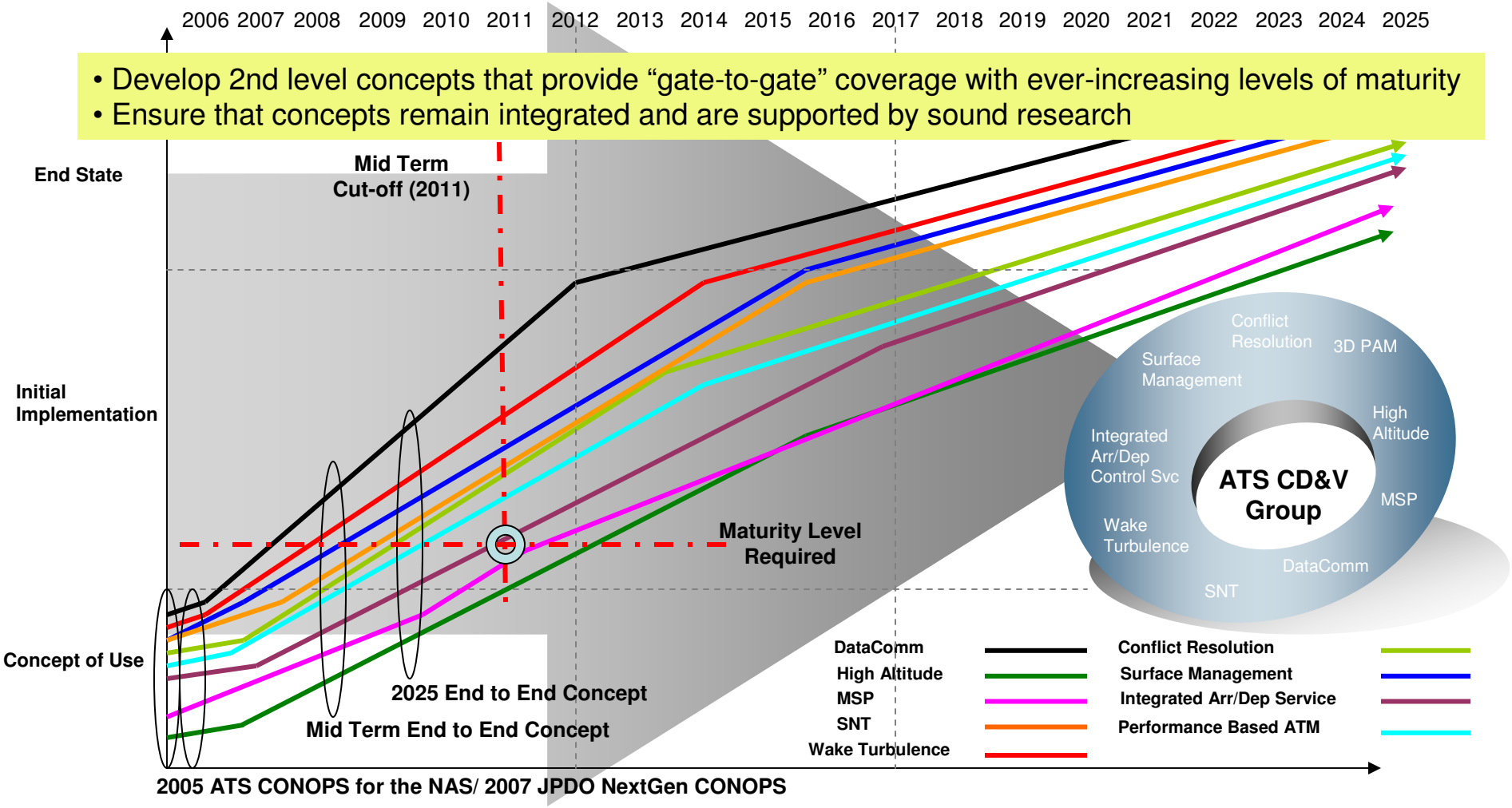
Some Key Dates

- NAS Midterm Operational Concept
  - Final Narrative 4/09
  - Concept Validation 10/10
- Staffed NextGen Towers
  - Operational Concept 9/08
  - Concept Validation HITLS/Demos FY09/FY10
- Datacomm Segment 2
  - Concept Validation and Requirements 7/10
- Tailored Arrivals
  - Miami Demos start 9/08
  - TA HITLS FY09
  - Requirements Spring FY10
- 3D PAM
  - Denver Trails start 9/09
  - Validated CONOPS Spring FY10
- Integrated ARR/DEP Management
  - Preliminary Requirements 04/09

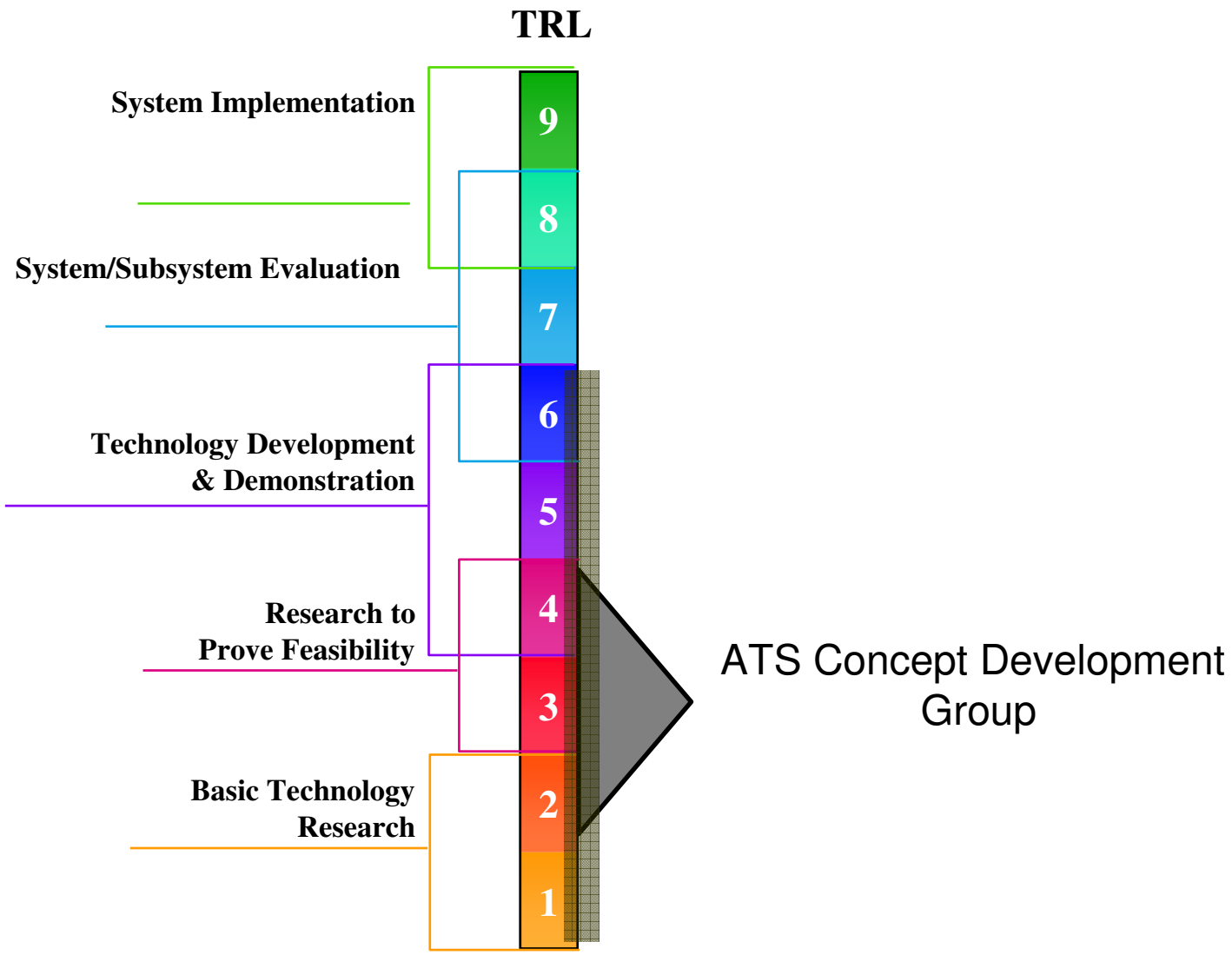
Concept Development and Validation Process



NAS to NextGen Transition



Technology Readiness Levels



Work in Progress

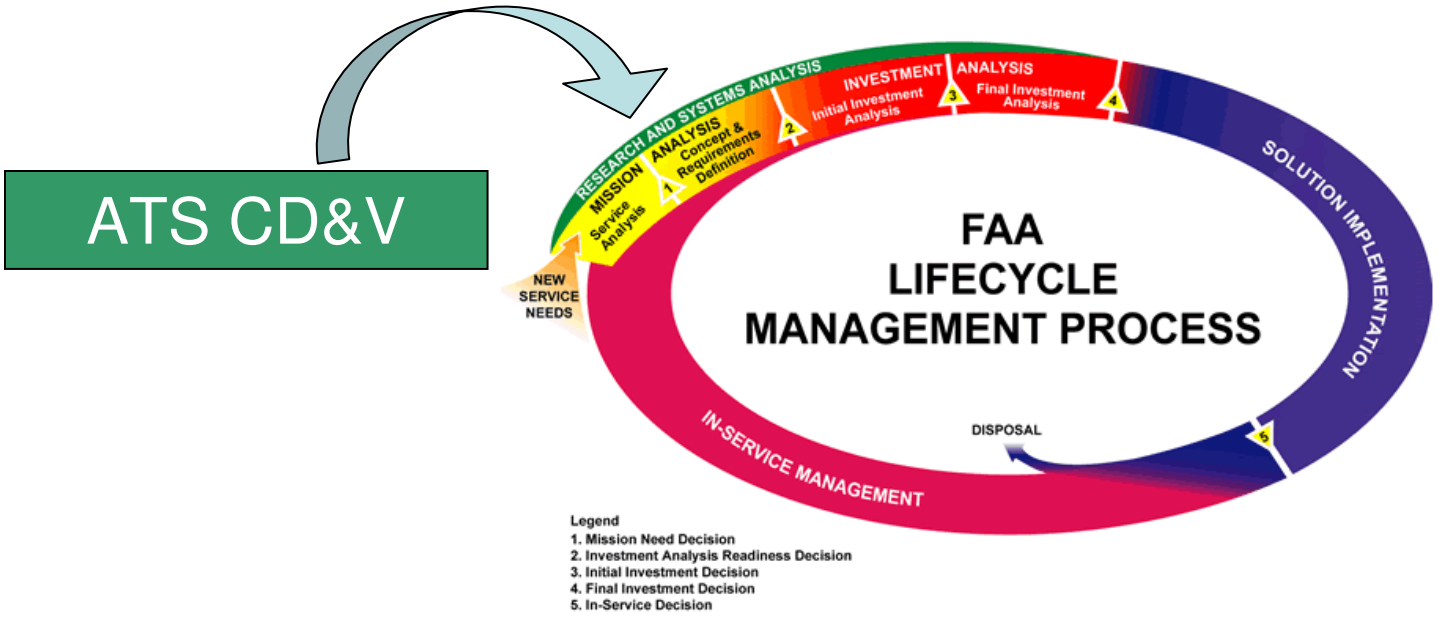
- Refine process for concept development and validation
- Develop Integrated Program Plan for Concept Development and Validation Projects
- Develop and coordinate (with service units) transition process with clear entry/exit criteria
- Prioritize research needs and requirements based on Next Gen end-state and transition sequence

Common Questions

- Who develops operational concepts?
  - Everybody - Operational service units, CAASD, NASA, every research project…
- Is there one authoritative source for CONOPS?
  - Not really. The manager of the group signs off on CONUSE documents for CRD. *Need to put in place requirement for 2nd level CONOPS developed by operational service units*.
- Who all signs CONOPS and CONUSE documents?
  - No clear guidance for CONOPS – Directors / VPs (EC)
  - CONUSE - Service Unit Directors and Mgr. CD&V group

Common Questions

- How do we prioritize CONOPS research?
  - For lack of clear priorities, research prioritized based on implementation timeline
- Where are you in AMS?



Common Questions

- Biggest question of all, what do we hand over?
  - Validated Operational Concepts
  - High level functional, operational and performance requirements
  - ROM cost benefits data
  - Safety risks